

ABSTRACT OF THE DISCLOSURE

The present invention discloses novel network architectures for evolving traditional service provider networks. The network architecture of the invention has a transport layer including an optical network. At least one node of the network

5 architecture includes a large packet switch that is coupled to the transport layer and to an access layer. The large packet switch aggregates a plurality of services from the access layer. The large packet switch also performs packet level grooming of the information from the services prior to transport of the information via the transport layer. The optical network performs restoration for the network architecture. In one

10 embodiment, the optical network is an optical ring network including at least one optical switch and restoration is performed at the layer-0 (optical layer). In another embodiment, the optical network is a bi-directional line-switched ring (BLSR) utilizing a Synchronous Optical Network (SONET) standard and restoration is performed by the layer-1 (SONET layer). The network architectures of the invention by utilizing a large

15 packet switch to perform service aggregation and packet level grooming, and by performing restoration either at the layer-0 (optical layer) or layer-1 (SONET layer), creates a single converged network that achieves the superior restoration performance needed for carrier grade availability but at much lower costs than traditional service providers which operate multiple overlay networks. Also disclosed are methods to

20 optimize traditional service provider networks and the disclosed novel architectures of the invention.